I. Cycloid scales imbedded in the skin.	
A. Eyes distinct or concealed under the skin.	
1. Two series of teeth in the lower jaw.	
a. Squamosal and parietal bones in contact.	
Tentacle conical, exsertile	1. *Ichthyophis*, Fitz.
Tentacle flap-like, below the nostril	4. *Cœcilia*, L.
Tentacle flap-like, posterior to the nostril	5. *Hypogeophis*, Ptrs.
Tentacle globular	6. *Dermophis*, Ptrs.
b. Squamosals separated from parietals.	
Tentacle flap-like, close to the eye	2. *Epicrionops*, Blgr.
Tentacle conical, exsertile, below the nostril	3. *Uræotyphlus*, Ptrs.
2. A single series of teeth in the lower jaw.	
Tentacle globular	7. *Cryptopsophis*, Blgr.
B. Eyes below the cranial bones.	
Tentacle globular, nearer the commissure of the jaws than the nostril	8. *Gymnopis*, Ptrs.
Tentacle globular, nearer the nostril than the commissure of the jaw	9. *Herpele*, Ptrs.
II. No scales.	
A. Eyes below the cranial bones.	
1. Two series of teeth in the lower jaw; squamosals in contact with parietals; tentacle globular	10. *Gegenophis*, Ptrs.
2. A single series of mandibular teeth; squamosals separated from parietals; tentacle globular	11. *Scolecomorphus*, Blgr.
B. Eyes distinct or concealed under the skin.	
1. A single series of teeth in the lower jaw; squamosals in contact with parietals; tentacle flap-like	12. *Siphonops*, Wagl.
2. Two series of teeth in the lower jaw; tentacle flap-like.	
Parietals and squamosals in contact	13. *Typhlonectes*, Ptrs.
Parietals separated from squamosals	14. *Chthonerpeton*, Ptrs.

XXII.—*On the 'Classification of the Coleoptera of North America,' by Dr. J. L. LeConte and Dr. G. H. Horn* (Washington: 1883). By the Rev. A. Matthews.

European entomologists are often impressed with the idea that their scientific brethren on the other side of the Atlantic are so embarrassed with the riches of their own fauna that they are comparatively unacquainted with the productions of the eastern hemisphere. But such a notion indicates a very imperfect comprehension of American intellect and American resources. No reason can be given to prove that a species

inhabiting any part of the Old World should not be as well known in Philadelphia as in London, Paris, or Berlin; and much less is there any reason to suppose that American entomologists are not, at the very least, as well able to appreciate its affinities as the most erudite of their European contemporaries. In some respects, indeed, they possess superior advantages, inasmuch as they have begun the science, as it were, *de novo*, unfettered by time-honoured traditions, and unbiassed by favourite, though antiquated, systems founded upon partial and often imperfect knowledge—systems which, although they fulfilled the conditions of their own age, are inadequate to meet the requirements of a time like the present, when a vastly extended field of observation, and a much more numerous band of students, assisted by greatly improved means of investigation, are continually enlarging our knowledge by the discovery of fresh links and synthetic forms disclosing correlative affinities between groups whose connexion had previously been unsuspected. In such a state of things a revision of our systematic classification was imperatively called for; and this work has been inaugurated by the recent publication of the 'Classification of the Coleoptera of North America,' by Dr. LeConte and Dr. Horn.

Although by its title this great work professes to deal with the fauna of merely one half of the western hemisphere, the comprehensive lines on which it has been constructed will include (with, it may be, trifling modifications) the Coleoptera of both sides of the world. Indeed it is evident from the work itself that its authors had this object in view, since every family at present contained in the order is mentioned, and its proper position in the system assigned to each. On this account many subtribes and subgroups are made which at first sight seem superfluous, represented as they are often by a single genus, and sometimes by a single species, in the North-American fauna; but the same subdivisions occasionally comprise an extensive series of insects in other quarters of the world.

The "Table of Contents" (pp. v, vi) gives a compendious view both of the completeness of this great work and of the labour expended on its construction. This is followed by an elaborate "Introduction" (pp. vii–xxxviii), which might well be termed an Introduction to the entire science of entomology. Having given a tabular view of all orders of insects, the Authors restrict their labours to the Coleoptera alone; and at this point commence their real work with a complete and lucid definitive analysis of the whole external skeleton of a beetle, illustrated by numerous and well-executed woodcuts of the

entire underside, and of the various modifications of the antennæ, tarsi, &c. which occur in the order.

The basis of operations being thus defined, they proceed with the actual classification by dividing the whole order into two primary divisions, viz. "Coleoptera genuina" and "Rhynchophora."

The former of these divisions, for which the term "Stomatophora" would have been more consonant, and also indicative of the normal position of the mouth, is then divided into two subdivisions, termed respectively "Isomera" and "Heteromera;" and the Isomera are separated into five series, viz. "Adephaga, Clavicornia, Serricornia, Lamellicornia, and Phytophaga."

It appears to me that the arrangement of the Isomera would be much improved by placing the Lamellicornia at the commencement of the subdivision, a change long ago suggested by Dr. Burmeister and Mr. Crotch, and even alluded to in the work before us. While the other series are more or less intimately connected with each other, the Lamellicornia alone are isolated and distinct from all. The authors of this classification, in order to bring into contact the closely allied Clavicornia and Serricornia, have removed the Lamellicornia from their ancient position between those series, and have placed them next in succession to the Serricornia, and immediately preceding the Phytophaga. But I cannot perceive that any improvement has been effected by this change. The Lamellicornia are as much, if not more, out of place between the Serricornia and the Longicorn group of the Phytophaga, as they were in their previous position. To place the Lamellicornia at the commencement of the order seems to be the only way to obviate this difficulty of classification.

In support of such an arrangement many collateral arguments may be adduced. As in the Mammalia man is allowed to take the lead as the most highly organized and perfect of the class, so in the Coleoptera, by a parity of reasoning, the first place should be assigned to the Lamellicornia, since they are the most highly organized and the most perfectly developed of that order. Again, among Coleoptera the Lamellicornia may be regarded as the representatives of the existing period of the universe, specially adapted to the present conditions of this planet; while, on the other hand, the Rhynchophora, exhibiting the most primæval and original form, and possessing the most rudimentary and often defective anatomy, are probably, according to Dr. LeConte's theory, the most ancient series of the whole order.

The Lamellicornia and the Rhynchophora should therefore

on this ground, either in an ascending or descending scale, occupy the two extremes of the entire order. In his 'Rhynchophora of America,' published at Philadelphia in 1876, Dr. LeConte has discussed this matter at some length, and, choosing the descending scale, has placed the Rhynchophora at the end of the Coleoptera.

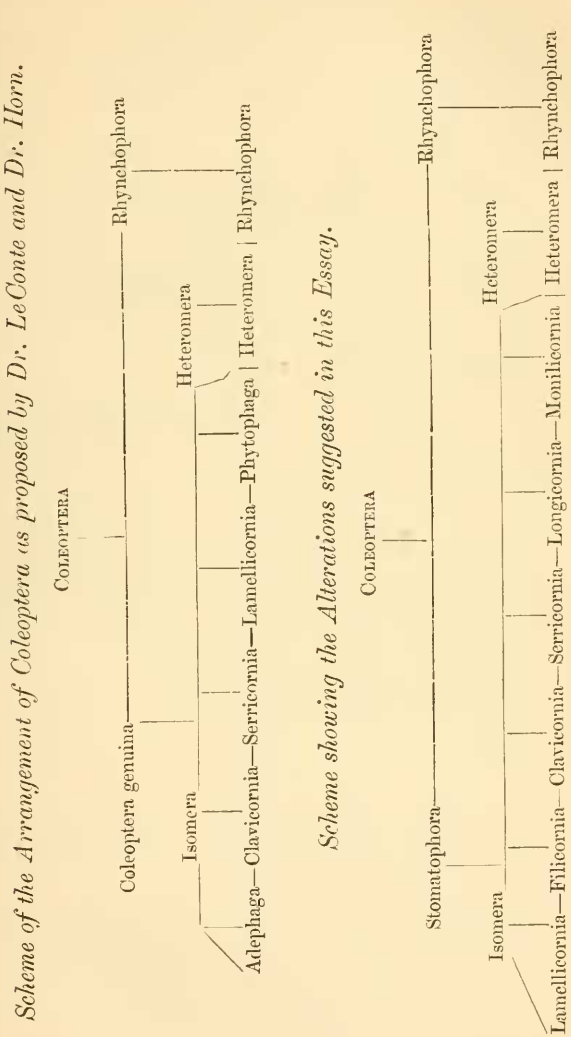
If his views on this point are correct, as I believe them to be, it will naturally follow that the Lamellicornia should be placed first. Such an arrangement would at once rectify the confusion caused by the interpolation of the Lamellicornia between series unconnected with them, but closely allied to each other; harmony would be effected by the elimination of the element of discord, and the Lamellicornia would occupy the position for which by high development and homogeneity among themselves they are preeminently qualified.

But to return to the work before us; the American authors have named the last series of the Isomera "Phytophaga," and have included in that series the whole of the properly Tetramerous Coleoptera. This arrangement seems open to objection on account of the heterogeneous assemblage of genera thus brought together. The authors themselves appear conscious of this, and justify the amalgamation on the ground that no definitive characters can be assigned to warrant their separation. But though anatomical differences among these families may not be sufficient or sufficiently persistent to form an intelligible tabulation, yet the general appearance or facies of almost every species is obvious enough to determine its proper position without much difficulty. On the whole it would, I think, be preferable to retain the serial separation of Longicornia and Monilicornia, of which the former in their larval condition as a rule feed on wood, and the latter on foliage. These alterations would tend to improve the continuity of its various series, and render the Isomerous complex more harmonious than it has hitherto been.

Having disposed of the Isomera, our authors place the Heteromera next in succession. This arrangement is a manifest improvement upon previous systems; for it is absurd to break the line of the Isomera by interposing a group whose very name indicates antagonism; and besides this the Heteromera, by their varied and mimetic forms, seem intended for a natural epitome of all the Isomerous series.

The Rhynchophora, as a suborder, conclude the whole system; nor could they hold any other position without breaking through the anatomical relations which prevail throughout the other groups. But this question has been argued at length by Dr. LeConte many years ago, and need not be noticed now.

The following schemes will show both the descent of the various series as proposed by Dr. LeConte and Dr. Horn and also the alterations which I have suggested:—



From this point the authors proceed to give a detailed account of the various families, tribes, subtribes, and genera

of which each series is composed, illustrating each separate division with a synoptic table of its contents and copious remarks on its diagnostic characters. In all these matters their views are of course open to discussion; whether a certain genus does or does not belong to a certain tribe is a matter of opinion, and can only be decided when its anatomical affinities have been thoroughly investigated. But these minutiæ are comparatively of small importance, and do not in any way affect the main lines of the system.

Such are the chief features of this great work, extending through 605 royal 8vo pages. The basis on which the system is founded, that of the entire external skeleton, is more consonant with the general scope of systematic arrangement in the higher classes of the animal kingdom, and much less liable to error than the tarsal or any other system which rests upon special organs alone. It is a system which only requires careful study to ensure approval; it has conferred a lasting benefit on science and much honour upon its authors. To assert that it is perfect would be to assert more than man can accomplish. It is at the least a long step in the right direction, and opens a path which must lead to further important results.

But the rôle of Lord Lytton's "Randall Leslie" and "John Burley" will continue to be repeated till the end of time, and plagiarists will doubtless reproduce the views of the American naturalists with some trifling modifications as their own. In the name of common honesty let those who henceforth build upon the lines here laid down have at least sufficient candour to acknowledge their obligations—a candour which recent events have proved to be rare.

XXIII.—*Notes on some Fossil Plants from Northern China.*

By J. S. Newberry*.

Mr. Arnold Hague recently placed in my hands a small collection of fossil plants brought by him from China. They proved to be interesting; and, with his permission, I present briefly the results of my examination of them.

The circumstances under which they were found, so far as known, are given in the subjoined notes of Mr. Hague which accompanied them :—

"This collection of plants came from the coal-basin of the

* From the 'American Journal of Science,' Aug. 1883, pp. 123–127.